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COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE
Legal Subcommittee
Thirtieth session
New York, 25 March-12 April 1991

DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

INTRODUCTION

Opening of the session

1. The Legal Subcommittee held its thirtieth session at United Nations Headquarters in New York from 25 March to 12 April 1991 under the chairmanship of Mr. Václav Mikulka (Czechoslovakia).

2. At the opening 539th meeting of the Subcommittee, the Chairman made a statement briefly describing the work to be undertaken by the Subcommittee at its current session. A summary of the Chairman's statement is contained in document A/AC.105/C.2/SR.539.

Adoption of the agenda

3. At the opening meeting, the Subcommittee adopted the following agenda (A/AC.105/C.2/L.180):

1. Opening of the session.

2. Statement by the Chairman.

3. The elaboration of draft principles relevant to the use of nuclear-power sources in outer space, with the aim of finalizing the draft set of principles.

READEX FICHE

4. Matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit without prejudice to the role of the International Telecommunication Union.

5. Consideration of the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries.

Attendance

4. Representatives of the following States members of the Subcommittee attended the session: Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Canada, Chad, Chile, China, Colombia, Czechoslovakia, Ecuador, Egypt, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Lebanon, Mexico, Mongolia, Morocco, Netherlands, Nigeria, Pakistan, Philippines, Poland, Portugal, Romania, Sweden, Syrian Arab Republic, Turkey, Ukrainian Soviet Socialist Republic, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela, Viet Nam and Yugoslavia.

5. Representatives of the following specialized agencies and international organizations attended the session: International Atomic Energy Agency (IAEA), International Telecommunication Union (ITU), United Nations Educational, Scientific and Cultural Organization (UNESCO), European Space Agency (ESA), International Astronautical Federation (IAF) and International Law Association (ILA).

6. The Chairman informed the Subcommittee at its 539th, 540th, 541st, 542nd, 544th and 545th meetings that requests to participate in meetings of the Subcommittee had been received from Cape Verde, Cuba, Ghana, Greece, the Libyan Arab Jamahiriya, Peru, Spain and Yemen. The Subcommittee agreed that, since the granting of observer status was the prerogative of the Committee on the Peaceful Uses of Outer Space, the Subcommittee could take no formal decision on the matter, but that the representatives of Cape Verde, Cuba, Ghana, Greece, the Libyan Arab Jamahiriya, Peru, Spain and Yemen might attend the formal meetings of the Subcommittee and could direct requests for the floor to the Chairman, should they wish to make statements.

7. A list of representatives of States members of the Subcommittee, States not members of the Subcommittee, specialized agencies and other organizations attending the session, and of the secretariat of the Subcommittee, is contained in document A/AC.105/C.2/INF/23.

Organization of work

8. In accordance with decisions taken at its opening meeting, the Subcommittee organized its work as follows:

(a) Pursuant to the recommendation of the Committee on the Peaceful Uses of Outer Space that the Legal Subcommittee, on a permanent basis, should rotate each year the order of consideration of substantive agenda items, 1/ it considered the three substantive items on its agenda (see para. 3 above) in the following order: item 4, item 5 and item 3;

(b) It re-established its Working Group on agenda item 3, open to all members of the Subcommittee, and agreed that Mr. Hans Winkler, the representative of Austria, should serve as its Chairman;

(c) It re-established its Working Group on agenda item 4, open to all members of the Subcommittee, and agreed that Mr. Estanislao Zawels, the representative of Argentina, should serve as its Chairman;

(d) It re-established its Working Group on agenda item 5, open to all members of the Subcommittee, and agreed that Mr. Raimundo Gonzalez, the representative of Chile, should serve as its Chairman;

(e) It began its work with a plenary meeting to hear delegations wishing to address the Subcommittee, and then adjourned and reconvened, when appropriate, as a working group, or began its work as a working group.

9. The following delegations participated in the general exchange of views: Argentina, Brazil, Bulgaria, Canada, Chile, China, Colombia, Czechoslovakia, France, Germany, Mexico, Nigeria, Pakistan, Soviet Union, Ukrainian SSR, United States, as well as IAF. The views expressed by those delegations are summarized in documents A/AC.105/C.2/SR.539-543.

10. The Working Group on agenda item 3 held ... meetings. The Working Group on agenda item 4 held four meetings. The Working Group on agenda item 5 held ... meetings.

11. The Chairmen of the working groups reported to the Subcommittee at its ... meeting, on 12 April (see annexes I, II and III to the present report). The Subcommittee took note with appreciation of the reports and of the work done in the working groups.

Notes

1/ See Official Records of the General Assembly, Forty-fifth Session, Supplement No. 20 (A/45/20), para. 143.

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

II. MATTERS RELATING TO THE DEFINITION AND DELIMITATION OF OUTER SPACE AND TO THE CHARACTER AND UTILIZATION OF THE GEOSTATIONARY ORBIT, INCLUDING CONSIDERATION OF WAYS AND MEANS TO ENSURE THE RATIONAL AND EQUITABLE USE OF THE GEOSTATIONARY ORBIT WITHOUT PREJUDICE TO THE ROLE OF THE INTERNATIONAL TELECOMMUNICAITON UNION (AGENDA ITEM 4)

1. The Chairman made an introductory statement on agenda item 4 at the 539th meeting, on 25 March. He referred to the work of the Subcommittee at its twenty-ninth session in 1990.

2. The Chairman drew attention to the fact that the General Assembly, in its resolution 45/72 of 11 December 1990, had decided that the Subcommittee, taking into account the concerns of all countries, particularly those of developing countries, should continue, through its Working Group, its consideration of matters relating to the definition and delimitation of outer space and to the character and utilization of the geostationary orbit, including consideration of ways and means to ensure the rational and equitable use of the geostationary orbit, without prejudice to the role of the International Telecommunication Union.

3. The Subcommittee noted that the subject of the geostationary orbit had been under consideration in the Scientific and Technical Subcommittee at its twenty-eighth session, in 1991, and that the relevant part of the report of that Subcommittee was contained in document A/AC.105/483, paragraphs 70-75.

4. The Subcommittee had before it working papers submitted at its previous sessions under this agenda item.

5. The views expressed by delegations during the debate on agenda item 4 are contained in summary records A/AC.105/C.2/SR.539-542.

6. As mentioned in paragraph 8 (c) above, the Subcommittee, at its 539th meeting, re-established its working group on agenda item 4 under the chairmanship of Mr. E. Zawaels, the representative of Argentina.

7. At the ... meeting, on ... April, the Chairman of the Working Group reported to the Subcommittee. The Subcommittee took note with appreciation of the report, which is set out in annex II to the present report.

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 4 (MATTERS RELATING TO THE DEFINITION AND DELIMITATION OF OUTER SPACE AND TO THE CHARACTER AND UTILIZATION OF THE GEOSTATIONARY ORBIT, INCLUDING CONSIDERATION OF WAYS AND MEANS TO ENSURE THE RATIONAL AND EQUITABLE USE OF THE GEOSTATIONARY ORBIT WITHOUT PREJUDICE TO THE ROLE OF THE INTERNATIONAL TELECOMMUNICATION UNION)

1. On 25 March 1991, the Legal Subcommittee re-established its Working Group on agenda item 4.

2. The Working Group had before it the report of the Legal Subcommittee on the work of its twenty-ninth session in 1990 (A/AC.105/457), which contained, in annex II, the report of the Chairman of the Working Group at the twenty-ninth session; it also had before it the report of the Scientific and Technical Subcommittee on the work of its twenty-eighth session in 1991 (A/AC.105/483), which considered, in chapter VI, inter alia, the subject of the "physical nature and technical attributes of the geostationary orbit".

3. The following documents submitted at previous sessions of the Legal Subcommittee and of the Committee on the Peaceful Uses of Outer Space were referred to in the course of the discussions: "Approach to the delimitation of airspace and outer space", submitted to the Subcommittee at its twenty-second session by the delegation of the Union of Soviet Socialist Republics (A/AC.105/C.2/L.139); "Draft general principles governing the geostationary orbit", submitted to the

Subcommittee at its twenty-third session by the delegations of Colombia, Ecuador, Indonesia and Kenya (A/AC.105/C.2/L.147); "Draft basic provisions of the General Assembly resolution on the delimitation of airspace and outer space and on the legal status of the geostationary satellites' orbital space", submitted to the Committee at its twenty-second session by the delegation of the Union of Soviet Socialist Republics (A/AC.105/L.112); "Compromise proposal on the question related to the definition and delimitation of outer space", submitted to the Committee at its thirtieth session by the delegation of the Union of Soviet Socialist Republics (A/AC.105/L.168); and a "working non-paper" circulated at the Subcommittee's twenty-eighth session in 1989 (A/AC.105/430, annex II, para. 20).

4. On the question of the organization of its work, pursuant to a recommendation by the Chairman, the Working Group agreed that each aspect of the agenda item (namely, the definition and delimitation of outer space, on the one hand, and the geostationary orbit, on the other) should be discussed by the Working Group separately.

5. The views expressed in the discussion within the Working Group are summarized below.

Question of the definition and delimitation of outer space

6. Some delegations, reiterating views expressed at previous sessions of the Subcommittee, stated that delimitation of airspace and outer space was a practical and legal necessity in order to establish a distinct boundary between the legal regime of airspace, with its inherent features of State sovereignty, territorial integrity and security, and the legal regime of outer space, which provided for the free exploration and use of outer space for the benefit of all countries. Those delegations believed that a delimitation of airspace and outer space was necessary in particular to determine the limits of the area governed by international space law. Some of those delegations expressed the view that, while at present there might not be agreed scientific criteria available for determining precisely the altitude at which airspace ended and outer space commenced, international custom had developed to the effect that the lowest perigee of orbiting satellites corresponded to the lower boundary of outer space. Some of those delegations also expressed the view that the delimitation of outer space should be accomplished by a legally binding international instrument, and that such instrument should take into account relevant provisions of the Chicago Convention on International Civil Aviation. Some delegations expressed the view that the rapid progress of space technology, including flights of reusable spacecrafts which land in aircraft mode, and the future advent in some countries of aerospace systems which would be able to operate both in outer space and in airspace, was an additional argument in favour of establishing an agreed boundary between airspace and outer space.

7. Some delegations considered the working paper submitted by the delegation of the Union of Soviet Socialist Republics to the Subcommittee at its twenty-second session in 1983 (A/AC.105/C.2/L.139) to be a good basis for a solution to the question under discussion. These delegations expressed their preparedness to consider any interim measures aimed at the eventual settlement of the question of

delimitation. In particular they referred to the proposals to consider the lowest perigee of an orbiting satellite as a lower boundary of outer space and to confirm the norm of customary law whereby all artificial Earth satellites placed in Earth orbit are considered to be in outer space. The view was also expressed that without agreed-upon delimitation, the possibility existed of unilateral delimitations of airspace which would create confusion, and every effort should be made to avoid such an eventuality. The view was expressed that a boundary between airspace and outer space could be established at an altitude of 90 kilometres above sea level.

8. Other delegations, reiterating views expressed at previous sessions of the Subcommittee, stated that there was at present no need for establishing a boundary between airspace and outer space. They believed that the lack of such a boundary had not led to any practical problems in the peaceful exploration of outer space, nor had it been an obstacle in the field, and that the utmost freedom of action was required for the successful continuation of such peaceful exploration for the benefit of all countries. Those delegations expressed the view that so far no convincing juridical and practical reasons had been introduced in favour of establishing an arbitrary line delimiting airspace and outer space and that, without clear scientific criteria, the delimitation would not only be inappropriate, but could also lead to a curtailing of future space activities. They noted that the current differing legal regimes applicable to airspace and outer space had operated well in their respective spheres, complementing and accommodating each other for the benefit of all States and peoples. The delegations stated that that smooth relationship had been possible largely because of, and not in spite of, the absence of an artificial delimitation between outer space and airspace. The view was also expressed that the future advent of aerospace vehicles did not adequately justify the delimitation of airspace and outer space.

9. Some delegations stated that in a spirit of good will and compromise and with the aim of finding mutually acceptable solutions, the Subcommittee, at its current session, should take an agreed decision to commence, at its next session in 1992, an exchange of views on the international legal aspects of future exploitation of aerospace systems. Those delegations believed that such an exchange of views could clarify a conceptual approach to the problem and would lead to a better understanding as to the expediency of elaborating, in the future, international legal rules regulating flights of aerospace systems at certain altitudes, in particular, rules concerning innocent passage through foreign airspace. In the view of those delegations, while there was an evident practical link between the problem of delimitation and the problem of regulating flights of aerospace systems, the consideration of the latter problem could commence before resolving the former one, and the Subcommittee could discuss them simultaneously. One of those delegations stated that, if the above-mentioned agreed decision was taken at the Subcommittee's current session, that delegation would be prepared to submit to the Subcommittee, at its next session in 1992, a working paper containing specific draft provisions regulating the utilization of aerospace systems at certain altitudes.

10. In reply, other delegations stated that it was difficult for them to support the adoption of the above "agreed decision" without a clear understanding as to what the implementation of that decision would involve. Those delegations expressed the view that they would need more information, perhaps in the form of a working paper or draft articles, in order to determine their position with regard to the above proposal, and that no consensus decision was needed in order to allow an interested delegation to submit a relevant working paper or to present and elaborate its views in oral statements. The view was expressed that the development of aerospace systems in various countries was still at the early research stage and that not enough was known about those systems to justify consideration of the matter in the near future. The view was also expressed that the delegation sponsoring the above proposal should be invited by the Working Group to submit a working paper concerning the international legal aspects of aerospace systems.

11. Some delegations expressed the view that, since there was no likelihood of producing tangible results in the consideration of the question of the definition and delimitation of outer space, the Subcommittee should consider dropping the item from its agenda or significantly reducing the time allotted to it. Other delegations expressed the view that the item should remain on the agenda of the Subcommittee and should be discussed in a constructive manner with all the delegations demonstrating a will to reach compromise. The view was also expressed that in view of this issue involving complicated political and technical factors and our knowledge of the upper atmosphere being far from adequate, it would be better not to make a hasty decision and that the Working Group could start an exchange of views on the legal aspects of aerospace systems.

Question of the geostationary orbit

12. After informal consultations on the subject, at the third meeting of the Working Group on 28 March 1991, a "working non-paper" was circulated by a group of delegations. The Chairman of the Group of 77, the Observer from Ghana, referring to that document, stated that it had been prepared by a number of countries members of the Group of 77. The Group of 77 welcomed that initiative and had come to the conclusion that the document could serve as a basis and starting-point for constructive deliberations in the Working Group, without prejudice to any other proposals or documents on the subject, which had been or would be introduced in the Legal Subcommittee on the subject. The text of the "working non-paper" was as follows:

"GEOSTATIONARY SATELLITE ORBIT

"1. The geostationary satellite orbit is a limited natural resource and, therefore, must be used in a rational and equitable manner and for the benefit of all mankind, taking into account the special needs of the developing countries.

"2. The development of space science and technology applied in the utilization of the geostationary satellite orbit is of fundamental importance for the economic, social and cultural development of the peoples of all States.

"3. The geostationary satellite orbit must be used exclusively for peaceful purposes for the benefit of all mankind through promoting international cooperation and understanding.

"4. The geostationary satellite orbit is a geometric locus in outer space where an object in orbit behaves differently with respect to the Earth from the way in which it would behave in any other locus in outer space.

"5. In view of all the foregoing, a special legal regime, complementary to that governing such other loci in outer space, is needed so as to ensure that the resource in question is used, in accordance with the relevant international agreements, in a rational, effective, economical and equitable manner.

"6. All States should be guaranteed in practice equitable access to the geostationary satellite orbit, in accordance with articles 10 and 33 of the Nairobi ITU Convention.

"7. In practice, equity would be achieved through the establishment of a concrete, specific preference, which would consist in the following:

"7.1 Where a developed country and a developing country have equal claims to access to the same orbital position, or where a country which has already had access and another country which has not yet had access have equal claims, preference shall be given to the developing country or to the country which has not yet had access."

13. Replying to a request for explanation, one delegation which had participated in the preparation of the "working non-paper", clarified certain elements of that document and stated, in particular, that the "working non-paper" did not touch upon certain ideas which had caused controversy in deliberations at previous sessions of the Working Group and could be used as a point of departure in the discussion.

14. Some delegations expressed their gratitude to the authors of the "working non-paper" and stated that, while some elements therein might require further elaboration, the document could serve as a useful basis for future negotiations in the Working Group.

15. Some delegations expressed the view that certain elements of the "working non-paper", such as contained, for example, in its paragraphs 1, 2 and 6, did not give rise to any difficulties, had not been criticized in the past and, therefore, might be acceptable to all.

16. A question was raised by one delegation concerning how the following situation would be resolved under the formulation in paragraph 7.1: a claim of a developed State which has technical capability to immediately launch a satellite to a GSO

orbital position is opposed to a claim of a developing State which intends to launch a satellite to the same position but has no technical capability to do so in the immediate future. In reply, it was stated by one of the authors of the "working non-paper" that in such a situation only substantiated claims should be taken into account, because not to use the position for which a claim was made would run counter to the principle of effectiveness recognized by international treaties.

17. The view was expressed by the observer of the International Telecommunication Union (ITU) that some elements contained in the "working non-paper" overlapped with procedures already accepted in ITU and, therefore, closer coordination with ITU might be necessary in future deliberations in the Working Group on the document, and that two satellites might have access to the same orbital position on the geostationary orbit, provided that they are using different radio frequencies.

18. The view was expressed that ITU acted in accordance with the will of States, since it defined its policies at a General Assembly in which all its member States participated. The view was also expressed that the proposal was aimed at solving the problems that might arise through radio-frequency interference when two satellites occupied the same position, since it was known that more than one satellite could occupy a single orbital position, depending on the orientation of their beams and as long as different radio frequencies were involved. When the "working non-paper" of the Group of 77 spoke of equal claims for access to a single orbital position, it referred to cases where that situation caused difficulties due to interference.

19. Some delegations also expressed the view that the roles of the Committee on the Peaceful Uses of Outer Space and ITU were complementary. As the geostationary orbit was not used exclusively for communication satellites and spectra, which were under ITU's jurisdiction, the Committee could deal with broader issues of general principles.

20. The view was expressed that the contents of the "working non-paper" constituted a number of statements, rather than legal principles, and, while some of those statements were acceptable, others gave rise to certain doubts. It was further stated that the formulation of paragraph 4 of the "working non-paper" was not quite clear and would need to be clarified through technical advice from natural scientists. Moreover, paragraph 7 of the "working non-paper" should be carefully pondered in the light of the results of the World Administrative Radio Conference on the Use of the Geostationary Satellite Orbit (WARC-ORB-85/88).

21. In summing up the discussion, the Chairman of the Working Group stated that the introduction of the "working non-paper" was a useful and constructive development, which gave hope for positive and promising debate in the future.

22. The Working Group held its final meeting on 3 April, when it considered and approved the present report.

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

III. CONSIDERATION OF THE LEGAL ASPECTS RELATED TO THE APPLICATION OF THE PRINCIPLE THAT THE EXPLORATION AND UTILIZATION OF OUTER SPACE SHOULD BE CARRIED OUT FOR THE BENEFIT AND IN THE INTERESTS OF ALL STATES, TAKING INTO PARTICULAR ACCOUNT THE NEEDS OF DEVELOPING COUNTRIES (AGENDA ITEM 5)

1. The Chairman made an introductory statement on agenda item 5 at the 543rd meeting, on 1 April 1991. He referred to the work of the Subcommittee at its twenty-ninth session in 1990.

2. The Chairman drew attention to the fact that the General Assembly, in its resolution 45/72, had decided that the Subcommittee, taking into account the concerns of all countries, particularly those of developing countries, should continue, through its Working Group, its consideration of the legal aspects related to the application of the principle that the exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries.

3. The Subcommittee had before it the replies received (A/AC.105/C.2/15 and Add.1-13) to a note verbale dated 26 September 1988, addressed by the Secretary-General to the States Members of the United Nations inviting them to submit their views as to the priority of specific subjects under agenda item 5 and to provide information on their national legal frameworks, if any, relating to the development of the application of the principle contained in article 1 of the 1967 Treaty on Principles Governing the Activities of States

in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

4. The Subcommittee also had before it the replies received (A/AC.105/C.2/16 and Add.1-10) to a note verbale dated 20 December 1989, addressed by the Secretary-General to the States Members of the United Nations inviting them to submit their views on the subject of international agreements that Member States had entered into that were relevant to the principle that the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries, taking into particular account the needs of developing countries.

5. The Subcommittee further had before it a compilation, prepared by the Secretariat, of the readily available multilateral agreements identified in the replies to the above request of the Secretary-General for information on such agreements, as well as lists of the States parties to those agreements.

6. The views expressed by delegations during the debate on agenda item 5 are contained in summary records A/AC.105/C.2/SR.543-545.

7. In the course of the debate on agenda item 5, some delegations, while welcoming measures adopted at the opening meeting at the Chairman's suggestion in order to further improve the utilization of conference resources, expressed the view that additional efforts should be made to build upon the Subcommittee's progress in the utilization of conference services. In this connection, those delegations, reiterating views which they had expressed in the past, stated that sessions of the Subcommittee should be reduced from three to two weeks, all future meetings should be held in New York rather than alternating between New York and Geneva and the current practice of spending equal time on agenda items regardless of their content or the likelihood of reaching consensus on them should be reviewed. The view was also expressed that the provision of summary records of meetings of the Subcommittee might not be justified in view of the high costs incurred in providing them.

8. In reply, other delegations expressed the view that questions pertaining to the working methods of the Subcommittee had no relation to agenda item 5, and therefore raising such questions during the debate under the item was inappropriate. Those delegations, reiterating views which they had expressed in the past, stated that the duration of the sessions of the Subcommittee should not be reduced, the current system of holding sessions alternately in New York and Geneva should be maintained and summary records should continue to be provided to the Subcommittee as they constituted travaux preparatoires and, therefore, were useful and important.

9. As mentioned in paragraph __ above, the Subcommittee, at its 539th meeting, re-established its Working Group on agenda item 5 under the chairmanship of Mr. Raimundo González, the representative of Chile.

10. At the ____ meeting, on __ April 1991, the Chairman of the Working Group reported to the Subcommittee. The Subcommittee took note with appreciation of the report, which is set out in annex III to the present report.

11. At the ___ meeting, on ___ April 1991, a working paper (A/AC.105/C.2/L.182) on agenda item 5 was circulated by the delegations of Brazil, ..., for consideration at the next session of the Subcommittee. The working paper is set out in section ___ of annex IV to the present report.

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

INTRODUCTION (continued)

1. At the opening meeting, the Chairman made a statement concerning the utilization of conference services by the Subcommittee. He drew attention to the importance the General Assembly and the Committee on Conferences attached to the effective utilization of conference services by all United Nations deliberative bodies and noted that the percentage of the use of conference services by the Subcommittee had improved lately, particularly at its last session, in 1990. In view of this, the Chairman proposed and the Subcommittee agreed that the following measures, similar to those adopted in 1990, should also be adopted at the current session of the Subcommittee:

(a) The Subcommittee and its working groups should begin their meetings punctually at the scheduled time, even if there was no quorum (14 members);

(b) The Department of Conference Services should be notified as early as possible whenever it was anticipated that any of the services usually provided were not going to be required. If possible, there should be 24 hours' prior notice;

(c) Informal consultations (i.e., outside the auspices of the Subcommittee and its working groups) should not interrupt the work of the Subcommittee or its working groups;

(d) The general rule for annexing documents to the report of the Subcommittee should be that normally any document would be annexed, if at all,

only once - to the report of the session in which it was first submitted, but not to later reports;

(e) The Subcommittee should not have plenary meetings in the afternoons when the agenda items on nuclear power sources, on the definition of outer space/geostationary orbit and on outer space benefits were being considered. Instead, the working groups on those items should meet;

(f) Delegations wishing to speak at the Subcommittee's next plenary meeting should inform the Chairman of their intention before the adjournment of the previous plenary meeting. If no such information was received by the Chairman, the next plenary meeting of the Subcommittee should be cancelled, and a working group should meet instead;

(g) The Subcommittee and its working groups should seek to schedule in advance informal consultations at which conference services would not be used. For this purpose, the Subcommittee and its working groups should decide as early as possible whether it is feasible to cancel in advance some of their formal meetings in order to have informal consultations among interested delegations. This measure, if adopted, should not preclude resorting to unscheduled informal consultations following a decision of the Subcommittee or a working group, if such consultations are deemed necessary for attaining progress in deliberations.

2. As to specific steps to implement measure (g) indicated in paragraph 1 above, the Chairman proposed and the Subcommittee agreed not to schedule six formal afternoon meetings on 26 and 27 March, and on 2, 3, 8 and 9 April so that informal consultations among interested delegations could be held instead.

3. The Subcommittee agreed that a similar organization of work as agreed upon at the current session would again serve as the basis for organizing the work of the Subcommittee's thirty-first session.

4. In the course of a general exchange of views, some delegations expressed their grave concern over the threat of extending the arms race into outer space. They believed that every effort should be made to avert that danger and that the Committee on the Peaceful Uses of Outer Space, as well as its subcommittees, could make important contributions in that regard, playing a supportive role for other international forums dealing with the problem of preventing an arms race in outer space. Those delegations pointed out in particular that the Legal Subcommittee, having elaborated the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, containing a number of important restrictions on certain military uses of outer space, was sufficiently competent to consider the question of the prevention of an arms race in outer space.

5. Other delegations, in the course of a general exchange of views, expressed the view that disarmament questions did not fall within the competence of either the Committee on the Peaceful Uses of Outer Space or its

subsidiary bodies. They pointed out that the question of the prevention of an arms race in outer space was properly a matter for the Conference on Disarmament. They were of the view that the Committee and its subcommittees should not be distracted from the task of promoting international cooperation in the peaceful uses of outer space by being drawn into areas belonging to the mandate of other forums.

6. The Subcommittee took note of the "Draft for a Convention on Manned Space Flight" presented at the session by the representative of the International Astronautical Federation (IAF). In this connection, some delegations expressed the view that legal aspects of manned space flights might be an appropriate subject for consideration by the Subcommittee in the future.

7. The Subcommittee held a total of ___ meetings. The views expressed at those meetings are summarized in documents A/AC.105/C.2/SR.539 to ___.

8. At its ___ meeting, on 12 April, the Subcommittee adopted the present report and concluded the work of its thirtieth session.

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 5 (CONSIDERATION OF THE LEGAL ASPECTS RELATED TO THE APPLICATION OF THE PRINCIPLE THAT THE EXPLORATION AND UTILIZATION OF OUTER SPACE SHOULD BE CARRIED OUT FOR THE BENEFIT AND IN THE INTERESTS OF ALL STATES, TAKING INTO PARTICULAR ACCOUNT THE NEEDS OF DEVELOPING COUNTRIES)

See document A/AC.105/C.2/WG/OSB(1991)/DR.1, with the following changes:

1. Add paragraph 13 (bis), to read as follows:

"In the view of some delegations, the work on this agenda item should help to strengthen the legal basis of international cooperation in outer space. Based on this, it would be important to focus on determining and developing international legal, rather than organizational and technical, aspects of international cooperation in outer space."

2. Paragraph 16. In the first sentence, after the words "to carry out their space activities" add the following: "guided by the principle of cooperation and mutual assistance, taking into account the interests of all States and also".

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

I. THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE, WITH THE AIM OF FINALIZING THE DRAFT SET OF PRINCIPLES (AGENDA ITEM 3)

1. The Chairman made an introductory statement on agenda item 3 at the 546th meeting, on 5 April. He referred to the work of the Subcommittee at its twenty-ninth session, in 1990.

2. The Chairman drew attention to the fact that the General Assembly, in its resolution 45/72, had decided that the Subcommittee, taking into account the concerns of all countries, particularly those of developing countries, should continue, through its Working Group, the elaboration of draft principles relevant to the use of nuclear power sources in outer space, with the aim of finalizing the draft set of principles.

3. The Subcommittee noted that its work in respect of the use of nuclear power sources in outer space had been reviewed by the Committee on the Peaceful Uses of Outer Space at its thirty-third session in 1990, that some progress had been made in the substantive consideration by the Committee of that subject and that the relevant parts of the Committee's report 1/ were contained in paragraphs 100 to 111 and 142 (a). The Subcommittee also noted that the subject of the use of nuclear power sources in outer space had been under consideration in the Scientific and Technical Subcommittee at its twenty-eighth session in 1991, and that the relevant parts of the report of that Subcommittee were contained in document A/AC.105/483, chapter IV.

4. The Subcommittee had before it a working paper submitted at its previous session by the delegation of Canada (A/AC.105/C.2/L.154/Rev.6), a working paper submitted to the Committee at its thirty-third session by the delegations of Canada and Germany (A/AC.105/C.2/L.154/Rev.7), a working paper submitted to the Subcommittee at its current session by the delegations of Canada, France, Germany and Sweden (A/AC.105/C.2/L.183) and a working paper submitted to the Subcommittee at its current session by the delegations of Canada, China, Czechoslovakia, France, Germany, Italy, the Netherlands, Sweden and the United Kingdom (A/AC.105/C.2/L.184). Those working papers are set out in sections __ of annex __ to the present report.

5. The views expressed by delegations during the debate on agenda item 3 are contained in summary records A/AC.105/C.2/SR.546-548.

6. As mentioned in paragraph __ above, the Subcommittee, at its 539th meeting, re-established its Working Group on agenda item 3 under the chairmanship of Mr. H. Winkler, the representative of Austria.

7. At the ___ meeting, on 12 April 1991, the Chairman of the Working Group reported to the Subcommittee. The Subcommittee took note with appreciation of the report, which is set out in annex I to the present report.

Notes

1/ Official Records of the General Assembly, Forty-fifth Session, Supplement No. 20 (A/45/20).

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DRAFT REPORT OF THE LEGAL SUBCOMMITTEE ON THE WORK OF ITS THIRTIETH SESSION

Addendum

REPORT OF THE CHAIRMAN OF THE WORKING GROUP ON AGENDA ITEM 3 (THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE, WITH THE AIM OF FINALIZING THE DRAFT SET OF PRINCIPLES)

See documents A/AC.105/C.2/WG/NPS(1991)/DR.1 and A/AC.105/C.2/WG/NPS(1991)/DR.2, with the following changes:

In document A/AC.105/C.2/WG/NPS(1991)/DR.1

1. Paragraphs 3 and 4. Add China and Netherlands to the list of sponsors of working paper A/AC.105/C.2/L.184.

2. Paragraph 5. In the second sentence, replace "The view was expressed" by "Some delegations expressed the view". In the third sentence, replace "that delegation" by "those delegations". In the fourth sentence, replace "That delegation" by "Those delegations".

French only: In the third sentence, replace "permettait" by "permettrait", and replace "contribuait" by "contribuerait".

3. Paragraph 6. In the last sentence, replace "new draft Principle 2" by "new draft Principle 4".

4. Paragraph 8. In the first sentence, replace "The view was expressed" by "Some delegations expressed the view". In the second sentence, replace "That delegation" by "Those delegations". In the last sentence, delete "however". Move the last sentence so that it becomes the penultimate sentence.

5. Paragraph 12. In the first sentence, replace "Some delegations expressed the view that" by "In accordance with the agreement reached by the Working Group at the twenty-ninth session of the Legal Subcommittee (A/AC.105/457, Annex I, paragraph 12), in order to consider in the light of Principle 7 the question of the proper location of a provision reflecting the content of". In the first sentence, after "document A/AC.105/C.2/L.177" replace "," by ".". In the first sentence, replace "and which had been deleted from the text adopted by consensus of draft principle 3 as contained in document A/AC.105/C.2/L.178," by "Some delegations proposed that this text".

In document A/AC.105/C.2/WG/NPS(1991)/DR.2

1. Paragraph 13. Add the following sentence: "In this regard, the view was expressed that as a result of the adoption of the IAEA Conventions on Early Notification of a Nuclear Accident and on Assistance in the Case of a Nuclear Accident or Radiological Emergency and recent incidents involving space objects with nuclear power sources on board, the Subcommittee needed to consider other refinements to draft Principle 7, as well as draft Principle 5."

2. Paragraph 15. French only. In the first sentence, replace "soit" by "était".

3. Paragraph 18. In the fifth sentence, replace "should" by "could". After the fifth sentence, insert "The view was also expressed that this suggestion did not appear to fully address the concerns previously raised". In the sixth sentence, replace "recommendations" by "the recommendations contained in".

4. Paragraph 20. After the second sentence, insert "Other delegations, while sharing the same view on the possibility of formulating a different definition of 'launching State' for each principle in which that term appeared, expressed, in this respect, a preference opposite to that of the above-mentioned delegations. Some delegations expressed the view that the possibility of developing such a single definition should be explored. Some delegations also expressed the view that a broader definition of the concept of 'launching State' should be considered, so as to include the many States involved in a single space operation." In the third sentence, after "an expanded form of" insert "the scope of".

5. Paragraph 21. In the first sentence, after "The view was expressed that the" insert "meaning of the", and at the end of that sentence, add "in order to allow for the proper use of both concepts in the work of the Subcommittee under different items of its agenda". Add the following sentence at the end of that paragraph: "The view was expressed that a reference to Article XII in this paragraph would be useful".

6. Paragraph 23. Replace "The view was expressed" by "Some delegations expressed the view".

7. Paragraph 24. In the first sentence, delete "be merged with paragraph 3 to".

8. Paragraph 28. In the second sentence, replace "the view was expressed that discussion of draft" by "some delegations expressed the view that, since Principle 3 had been agreed upon by consensus at the last session of the Legal Subcommittee,". In the third sentence, replace "before the conclusion" by "at the end".

9. Paragraphs 26 through 29. Renumber as paragraphs 25 through 28.

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Agenda item 5

CONSIDERATION OF THE LEGAL ASPECTS RELATED TO THE APPLICATION OF THE PRINCIPLE THAT THE EXPLORATION AND UTILIZATION OF OUTER SPACE SHOULD BE CARRIED OUT FOR THE BENEFIT AND IN THE INTERESTS OF ALL STATES, TAKING INTO PARTICULAR ACCOUNT THE NEEDS OF DEVELOPING COUNTRIES

Principles regarding international cooperation in the exploration and utilization of outer space for peaceful purposes

Working paper submitted by Argentina, Brazil, Chile, Mexico, Nigeria, Pakistan, the Philippines, Uruguay and Venezuela

The General Assembly,

Bearing in mind the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,

Bearing also in mind the provisions of the Charter of the United Nations, in particular Articles 55 and 56 thereof,

Recalling General Assembly resolutions 1803 (XVII) of 14 December 1962, 2625 (XXV) of 24 October 1970, 3281 (XXIX) of 12 December 1974 and 3362 (S-VII) of 16 September 1975,

Desirous of strengthening and further developing the principle that the exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of mankind,

Further recalling that outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law,

Stressing the need to facilitate and encourage international cooperation in outer space activities and in outer space investigation,

Stressing also that the utilization and exploration of outer space shall be maintained exclusively for peaceful purposes,

Determined to maintain outer space for peaceful purposes through the promotion of international cooperation in its exploration and utilization,

Conscious of the need to utilize outer space in a rational and equitable manner as well as to preserve it for future generations,

Adopts the following Principles regarding International Cooperation in the Exploration and Utilization of Outer Space for Peaceful Purposes.

Annex

Principles regarding international cooperation in the exploration and utilization of outer space for peaceful purposes

I

1. The exploration and utilization of outer space should be carried out for the benefit and in the interests of all States, taking into particular account the needs of developing countries.

2. States with relevant space capabilities and with programmes for the utilization and exploration of outer space bear a special responsibility in promoting and fostering international cooperation in outer space science and technology and in their applications.

II

1. All States should have access to the knowledge and applications derived from the exploration and use of outer space on an equitable, non-discriminatory and timely basis.

2. States pursuing programmes of utilization and exploration of outer space should allow access to the knowledge and applications derived therefrom to other States, particularly developing countries, through programmes of international cooperation specifically designed for that purpose.

3. Conditions offered to one State in a specific programme of cooperation in outer space should be extended to other countries with which a similar programme of international cooperation is established.

4. In pursuing international cooperation in the utilization and exploration of outer space, developing countries should benefit from special treatment. Preference should be given to developing countries in programmes oriented to the dissemination of scientific and technological knowledge, and no reciprocity should be asked from countries benefiting from such special treatment.

III

1. The main objective to be pursued by international cooperation in outer space should be the development by all States of indigenous capability in space science and technology and their applications.

2. States with relevant space capabilities and with programmes of utilization and exploration of outer space should promote and facilitate the exchange of expertise and technology to all States, particularly the developing countries.

3. States should promote the exchange of material and equipment for, and the transfer of technology on, the utilization and exploration of outer space within just and equitable parameters of price and payment.

IV

1. International cooperation in the utilization and exploration of outer space should be exclusively for peaceful purposes.

2. States providing or benefiting from international cooperation in outer space science and technology and its applications should ensure that they are used exclusively for peaceful purposes.

3. No arbitrary or discriminatory conditions should be applied to any knowledge and applications destined for the peaceful uses and exploration of outer space. To this end, negotiated international guidelines should be established to facilitate the objective settling of prerequisites for equipment and technological transfers.

V

1. All States should pursue their activities in outer space with due regard to the need to preserve outer space, in such a way as not to hinder its continued utilization and exploration.

2. States should pay attention to all aspects related to the protection and preservation of the outer space environment, especially those potentially affecting the Earth's environment.

3. States with relevant space capabilities and with programmes for the utilization and exploration of outer space should share with developing countries on an equitable basis the scientific and technological knowledge

necessary for the proper development of programmes oriented to the more rational utilization and exploration of outer space.

VI

1. The role of the United Nations and the scope of its activities in international cooperation in the utilization and exploration of outer space should be strengthened and enlarged, particularly through the Programme on Space Applications.

2. All States should contribute to fund the Programme on Space Applications in accordance with their space capabilities and their participation in the exploration and utilization of outer space.

3. In order to give concrete meaning to these Principles regarding International Cooperation in the Exploration and Utilization of Outer Space for Peaceful Purposes, States should concentrate their efforts in the following areas:

(a) Promotion of the development of indigenous capability in space science and technology, particularly in the developing countries;

(b) Continued exchange of information, data, materials and equipment on space science and technology;

(c) Promotion of joint partnerships or ventures in the spheres of space science and technology;

(d) Promotion of easy and low-cost accessibility and availability of remote-sensing data, the ground receiving stations and the digital image processing system;

(e) Technical cooperation to promote and facilitate the transfer of technology and expertise in space science and technology, particularly with the developing countries;

(f) Redistribution of the spin-off benefits of space science and technology.

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THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

Working paper submitted by Canada, France, Germany and Sweden

Principle 2

As indicated in working paper A/AC.105/C.2/L.154/Rev.7 of 20 June 1990, submitted by Canada and Germany, principles 2 and 4 have been considered together. As a result it is proposed that principle 2 be deleted and that principle 4 read as follows:

Principle 4: Safety assessment

1. A State launching a space object* with a nuclear power source on board shall conduct a thorough and comprehensive safety assessment prior to each launch. This assessment shall cover as well all relevant phases of the mission and shall deal with all systems involved, including, for example, the means of launching, the space platform, the nuclear power source and its equipment, and the means of control and communication between ground and space.

2. This assessment shall respect the guidelines and criteria for safe use contained in principle 3.

3. The results, detailed when practicable, of this safety assessment shall be made publicly available prior to each launch through the Secretary-General of the United Nations.

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* The term "State launching a space object" is to be further considered.

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THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

Working paper submitted by Canada, China, Czechoslovakia, France, Germany, Italy, the Netherlands, Sweden and the United Kingdom of Great Britain and Northern Ireland

Principle 8: Responsibility

1. States shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, involving the use of nuclear power sources, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that such national activities are carried out in conformity with the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and the recommendations contained in these principles.

2. When activities in outer space involving the use of a nuclear power source are carried on by an international organization, responsibility for compliance with the aforesaid Treaty and the recommendations contained in these principles shall be borne both by the international organization and by the States participating in it.

Principle 9: Liability and compensation

1. In accordance with article VII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the

Moon and Other Celestial Bodies, and the provisions of the Convention on International Liability for Damage Caused by Space Objects, States which launch or procure the launching of a space object carrying a nuclear power source or States from whose territory or facility a space object carrying a nuclear power source is launched, shall be internationally liable for damage caused by such space objects or their component parts.

2. The compensation that such States shall be liable to pay for damage shall be determined in accordance with international law and the principles of justice and equity in order to provide such reparation in respect of the damage as will restore the person, natural or juridical, State or international organization on whose behalf a claim is presented to the condition which would have existed if the damage had not occurred.

3. Compensation shall also include reimbursement of the duly substantiated expenses for search, recovery and clean-up operations, including expenses for assistance received from third parties.

4. Claims for compensation for damage shall be presented and settled in accordance with the provisions of the Convention on International Liability for Damage Caused by Space Objects.

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THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN SPACE

Working paper submitted by the United States of America

Since the adoption of principle 3 on the guidelines and criteria for the safe use of nuclear power sources (NPS), the United States has conducted an extensive review to verify the technical accuracy and consistency of principle 3 with proven United States methods. Based on that review, the United States submitted a working paper, A/AC.105/C.1/L.176 of 26 February 1991, which outlined clarifications and modifications to principle 3 which we believe will significantly enhance the technical credibility of the recommendations.

The United States noted at the twenty-eighth session of the Scientific and Technical Subcommittee that its ongoing review would be complete by the current meeting of the Legal Subcommittee. The United States has completed its review and has concluded that no further clarifications beyond those previously identified are necessary.

In the view of the United States, the Subcommittee should endeavour to ensure that the highest scientific and technical standards are met in every one of the recommendations developed. Principles based on our recommendations will only be as strong as the recommendations themselves.

It is in this spirit that the United States proposes to revisit certain specific portions of principle 3 of the Legal Subcommittee as contained in document A/AC.105/C.2/L.178 of 9 April 1990.

Regarding the opening paragraph of principle 3, we believe that it is appropriate for all the principles to stress that the use of nuclear power sources should be based on technical needs with full consideration of safety and environmental concerns. It is, however, incongruous for one principle to have its own preamble. We propose, therefore, to delete that paragraph in principle 3.

Throughout the recommendations, "shall" and "must" should be replaced with "should". In our view, this is clearly consistent with the non-binding, recommendatory nature of the principles.

We would also recommend another clarification to be made throughout the text, replacing the word "foreseeable" with the word "credible". The United States safety assessments which cleared the Ulysses and Galileo spacecraft for launch limited the universe of hypothetical accident scenarios to those with reasonable probability of occurrence. This set of scenarios was thus labelled as "credible". This change brings the usage in the recommendations into conformity with this established formulation.

The United States proposes that the concept of dose limits be re-examined and recommends that paragraph 1.3 of A/AC.105/L.178 be modified. We recommend substituting the following language for the current second and third subparagraphs:

> "Except in cases of low-probability accidents with potentially serious radiological consequences, the design for the NPS systems <u>should</u> [shall], with a high degree of confidence, restrict radiation exposure to a limited geographical region and to individuals <u>in the public to risks (probability of exposure times consequence) which are as low as reasonably achievable</u>."

In the view of the United States, this modification, by taking into account the probabilistic concept of risk, which is a central feature of a thorough safety assessment, relates the recommendation directly to the well-proven space NPS practices of the United States.

A similar type of clarification is recommended for the first two sentences of part 1.4, to read:

> "Systems important for safety <u>should</u> [shall] be designed, constructed and operated in accordance with the general concept of defence-in-depth, <u>as appropriately adapted for space nuclear systems</u>. Pursuant to this concept, <u>credible</u> [foreseeable] safety-related failures or malfunctions must be <u>compensated for by design or</u> capable of being corrected or counteracted by an action or a procedure, possibly automatic."

We believe that this clarification removes any doubts as to the intent behind the application of the term "defence-in-depth". As was clear at the time that the Legal Subcommittee reached consensus on this principle, the

Subcommittee did not intend to apply the terrestrial standards as such to space systems. The second sentence of paragraph 1.4, as it now appears, makes no provision for passive systems, such as RTGs, or for the preferred solution, in the case of either passive or active systems, of countering risks by system or mission design. The refinement proposed by the United States contributes materially to the completeness of the paragraph.

Related to the proposed modifications to the reference to "defence-in-depth", the United States believes that the current use of "inter alia" in the second paragraph of 1.4 should be clearly understood. We note that in subparagraph 1 of 1.4 in A/AC.105/C.2/L.178 the term "for example" precedes the recommendation that successive barriers be considered. It is our view that in paragraph 1.4 of A/AC.105/C.2/L.178 "inter alia" should be replaced with "for example". It is our view that there need not necessarily be other means of ensuring reliability beyond those listed in the remainder of the sentence, or that any or all of those listed must be employed in a given NPS. The United States expressed this view in joining the consensus on principle 3 in the Legal Subcommittee and wishes to reconfirm that view here.

The United States believes the Subcommittee's intent in paragraph 2.4 was that NPS would not be operated at power for sustained periods of time so as to generate a meaningful radionuclide inventory. Zero power critical testing is an important part of launch safety that does not produce significant radionuclides. Without such testing, a NPS would be less safe. Therefore, the following language is suggested for paragraph 2.4:

> "Nuclear reactors should [shall] not be made critical during or after launch until [before] they have reached their operating orbit or [interplanetary] trajectory."

Finally, the last clarification we recommend involves paragraph 3.2 of A/AC.105/C.2/L.178. The United States believes that the paragraph should read:

> "Except for low probability occurrences, the nuclear fuel in radioisotope generators should [shall] be protected by a containment system that is designed and constructed to withstand the heat and aerodynamic forces of re-entry in the upper atmosphere under credible [foreseeable] orbital conditions. [including highly elliptical or hyperbolic orbits where relevant.] Upon impact, the containment system and the physical form of the isotope should [shall] ensure that any radioactive material scattered into the environment is localized, so that the impact area can be [completely] cleared of radioactivity by a recovery operation."

The first change is intended to take into account the fact that the probability of accidental re-entry from a hyperbolic or highly elliptical orbit can be reduced to a very low value by mission design and operations.

The change in the last sentence is in recognition of the fact that the practical design objective for RTG containment systems is localization rather than zero release under all circumstances, and that there are practical limits from a cost-versus-risk standpoint on "complete" clearing of radioactivity by a recovery operation.

Summary

The United States wishes to emphasize that these proposed clarifications and modifications to the Subcommittee's recommendations are offered in a constructive spirit, and reiterate the proposed changes as presented to the twenty-eighth session of the Scientific and Technical Subcommittee in the United States working paper A/AC.105/C.1/L.176 of 26 February 1991. We are seeking to contribute further to the substantial progress made in the Committee on NPS. We view these proposed refinements as steps towards a meaningful set of recommendations that are based on sound scientific and technical findings. Ultimately, any principles adopted on the basis of this Subcommittee's recommendations will only be as strong as the scientific and technical merit behind them.

An annex to the present paper provides the proposed United States changes as they would appear in Legal Subcommittee document A/AC.105/C.2/L.178, in which deleted words have been placed within brackets, and added words have been underscored.

Annex

THE ELABORATION OF DRAFT PRINCIPLES RELEVANT TO THE USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

Proposal by the United States of America on principle 3

Principle 3: Guidelines and criteria for safe use

[In order to minimize the quantity of radioactive material in space and the risks involved, the use of nuclear power sources (NPS) in outer space shall be restricted to those space missions which cannot be operated by non-nuclear energy sources in a reasonable way.]

1. General goals for radiation protection and nuclear safety

1.1 States launching space objects with NPS on board [shall] should endeavour to protect individuals, populations and the biosphere against radiological hazards. The design and use of space objects with NPS on board [shall] should ensure, with a high degree of confidence, that the hazards, in [foreseeable] credible operational or accidental circumstances, are kept below acceptable levels as defined in paragraphs 1.2 and 1.3. Such design and use [shall] should also ensure with high reliability the radioactive material does not cause a significant contamination of outer space.

1.2 During the normal operation of space objects with NPS on board, including re-entry from the sufficiently high orbit (SHO) as defined in paragraph 2.2, the appropriate radiation protection objective for the public recommended by the International Commission on Radiological Protection (ICRP) [shall] should be observed. During such normal operation there [shall] should be no significant radiation exposure.

1.3 To limit exposure in accidents, the design and construction of the NPS systems [shall] should take into account relevant and generally accepted international radiological protection guidelines.

Except in cases of low probability accidents with potentially serious radiological consequences, the design for the NPS system [shall] should, with a high degree of confidence, restrict radiation exposure to a limited geographical region and to individuals in the public to risks (probability of exposure times consequence) which are as low as reasonably achievable. [to the principal limit of 1 mSv in a year. It is permissible to use a subsidiary dose limit of 5 mSv in a year for some years, provided that the average annual effective dose equivalent over a lifetime does not exceed the principal limit of 1 mSv in a year.]

[The probability of accidents with potentially serious radiological consequences referred to above shall be kept extremely small by virtue of the design of the system.]

Future modifications of the guidelines referred to in this paragraph [shall] should be applied as soon as practicable.

1.4 Systems important for safety [shall] should be designed, constructed and operated in accordance with the general concept of defence-in-depth as appropriately adapted for space nuclear systems. Pursuant to this concept, [foreseeable] credible safety-related failures or malfunctions [must] should be compensated for by design or capable of being corrected or counteracted by an action or a procedure, possibly automatic.

The reliability of systems important for safety [shall] should be ensured, [inter alia] for example, by redundancy, physical separation, functional isolation and adequate independence of their components.

Other measures [shall] should also be taken to raise the level of safety.

2. Nuclear reactors

2.1 Nuclear reactors may be operated:

(i) On interplanetary missions;

(ii) In sufficiently high orbits (SHO) as defined in paragraph 2.2;

(iii) In low Earth orbits if they are stored in SHO after the operational part of their mission.

2.2 The SHO is one in which the orbital lifetime is long enough to allow for a sufficient decay of the fission products to approximately the activity of the actinides. The SHO must be such that the risks to existing and future outer space missions and of collision with other space objects are kept to a minimum. The necessity for the parts of a destroyed reactor also to attain the required decay time before re-entering the Earth's atmosphere [shall] should be considered in determining the SHO altitude.

2.3 Nuclear reactors [shall] should use only highly enriched uranium 235 as fuel. The design [shall] should take into account the radioactive decay of the fission and activation products.

2.4 Nuclear reactors [shall] should not be made critical [before] during or after launch until they have reached their operating orbit or [interplanetary] trajectory.

2.5 The design and construction of the nuclear reactor [shall] should ensure that it cannot become critical before reaching the operating orbit during all possible events, including rocket explosion, re-entry, impact on ground or water, submersion in water or water intruding into the core.

2.6 In order to reduce significantly the possibility of failures in satellites with nuclear reactors on board during operations in an orbit with a lifetime less than in the SHO (including operations for transfer into the SHO), there [shall] should be a highly reliable operational system to ensure an effective and controlled disposal of the reactor.

3. Radio-isotope generators

3.1 Radio-isotope generators may be used for interplanetary missions and other missions leaving the gravity field of the Earth. They may also be used in Earth orbit if, after conclusion of the operational part of their mission, they are stored in a high orbit. In any case ultimate disposal is necessary.

3.2 Except for low probability occurrences, the nuclear fuel in radio-isotope generators [shall] should be protected by a containment system that is designed and constructed to withstand the heat and aerodynamic forces of re-entry in the upper atmosphere under [foreseeable] credible orbital conditions [, including highly elliptical or hyperbolic orbits where relevant]. Upon impact, the containment system and the physical form of the isotope [shall] should ensure that [no] any radioactive material [is] scattered into the environment is localized, so that the impact area can be [completely] cleared of radioactivity by a recovery operation.